

CLAIMS

1. A lithium secondary battery comprising:

an electrode body having a positive electrode, a negative  
5 electrode, and a separator, the positive electrode and the  
negative electrode being wound or laminated by means of the  
separator, and

a nonaqueous electrolyte solution containing a lithium  
compound as an electrolyte;

10 characterized in that at least one of the positive electrode,  
the negative electrode, the separator, and the nonaqueous  
electrolyte solution contains at least one of:

(a) an organic and/or inorganic inhibitor, which functions  
as a Cu-corrosion inhibitor or a Cu-trapping agent,

15 (b) a compound having an organic base and an inorganic  
acid which are unitarily combined in a molecule,

(c) a cyclic compound containing a N-O radical in a  
molecular structure,

20 (d) a cyclic compound which becomes a  $Mn^{2+}$  supplier in  
the nonaqueous electrolyte solution,

(e) a compound containing an atom showing Lewis acidity  
and an atom showing Lewis basicity in one molecule molecular-  
structurally,

(f) a three-dimensional siloxane compound, and

25 (g) a nonionic surfactant; or

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the nonaqueous electrolyte solution contains:

(h) a water-extracting agent, or

(i) a hydrofluoric acid-extracting agent.

5 2. A lithium secondary battery according to claim 1, wherein a  
central element of a polar group of said organic inhibitor  
contains at least one selected from the group consisting of N, P  
and As in 5B group and O, S and Se in 6B group of the periodic  
table.

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3. A lithium secondary battery according to claim 1, wherein  
said organic inhibitor is a sulfur compound.

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4. A lithium secondary battery according to claim 1, wherein  
said organic inhibitor is an imidazole-analogue organic  
compound.

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5. A lithium secondary battery according to claim 1, wherein  
said inorganic inhibitor is one selected from the group consisting  
of phosphates, chromates, iron, or ionic compounds, nitrites,  
and silicates.

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6. A lithium secondary battery according to claim 1, wherein  
said organic base of said compound (b) is a cyclic compound  
containing an electron-donating element.

7. A lithium secondary battery according to claim 1, wherein said organic base of said compound (b) contains an electron-donating substituent.

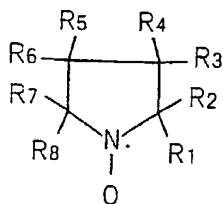
5 8. A lithium secondary battery according to claim 1, wherein said inorganic acid of said compound (b) is a strong acid.

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10 9. A lithium secondary battery according to claim 1, wherein said inorganic acid of said compound (b) is hydrogen chloride or sulfuric acid.

10. A lithium secondary battery according to claim 1, wherein said cyclic compound containing a N-O radical in a molecular structure is a compound having one ring.

15 11. A lithium secondary battery according to claim 1, wherein said cyclic compound containing a N-O radical in a molecular structure is a compound having a molecular structure shown by the following general formula (I);

20 General formula (I):

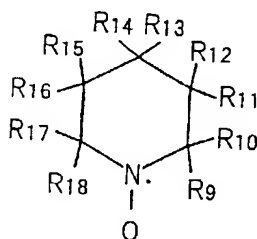


25 ( $R_1 - R_8$ : a hydrogen radical, a hydrocarbon radical, or a cyano

radical)

12. A lithium secondary battery according to claim 1 or 2,  
wherein said cyclic compound containing a N-O radical in a  
5 molecular structure is a compound having a molecular structure  
shown by the following general formula (II);

General formula (II):

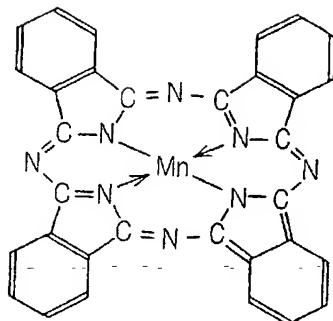


(R<sub>9</sub> - R<sub>18</sub>: a hydrogen radical, a hydrocarbon radical, or a cyano radical)

13. A lithium secondary battery according to claim 1, wherein  
said cyclic compound which becomes a Mn<sup>2+</sup> supplier is  
manganese (II) phthalocyanine or a manganese (II)  
phthalocyanine derivative.

14. A lithium secondary battery according to claim 1, wherein  
said compound (e) is alumatrane tetramer shown by the following  
chemical formula (III).

Chemical formula (III)



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15. A lithium secondary battery according to claim 1, characterized in that said nonionic surfactant is a compound having an ether linkage.

16. A lithium secondary battery according to claim 1, wherein said nonionic surfactant is represented by the general formula  $R_1(OR_2)_nR_3R_4$  ( $n$  is an integer), the  $R_1$  radical and the  $R_2$  radical are groups mainly containing hydrogen (H) and/or carbon (C), the  $R_3$  radical is a group of oxygen (O), nitrogen (N), or an ether linkage (OCO), with linking on the side of the  $R_2$  radical, and the  $R_4$  radical is not hydrogen (H) but a group mainly containing hydrogen (H) and carbon (C).

17. A lithium secondary battery according to claim 1, wherein said lithium compound is lithium phosphate hexafluoride.

18. A lithium secondary battery according to claim 1, wherein lithium manganate having a cubic spinel structure having

lithium and manganese as main components is used as a positive active material.

19. A lithium secondary battery according to claim 1, wherein a  
5 carbonaceous material is used as a negative active material.

10 20. A lithium secondary battery according to claim 1, wherein  
said water-extracting agent dissolves in said nonaqueous  
electrolyte solution.

21. A lithium secondary battery according to claim 1, wherein  
said water-extracting agent is an organic phosphorous  
compound.

15 22. A lithium secondary battery according to claim 1, wherein a  
hydrofluoric acid-extracting agent is added to said electrolyte  
solution.

20 23. A lithium secondary battery according to claim 1, wherein  
said hydrofluoric acid-extracting agent is an organic silicon  
compound or an organic antimony compound.

24. A lithium secondary battery according to claim 1, wherein  
said hydrofluoric acid-extracting agent is one capable of  
25 dissolving in said nonaqueous electrolyte solution.

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5 26. A lithium secondary battery according to any one of claims 1  
- 25, wherein the battery is for being mounted on a vehicle.

27. A lithium secondary battery according to claim 26, wherein  
the battery is used for an electric vehicle or a hybrid electric  
10 vehicle.

28. A lithium secondary battery according to claim 26, wherein the battery is used for starting of an engine.